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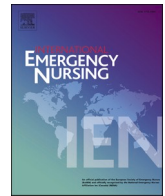
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# Challenges associated with recovery from blunt thoracic injuries from hospital admission to six-months after discharge: A qualitative interview study

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## ABSTRACT

**Background:** Recovery for patients presenting to trauma services globally with blunt thoracic injury (BTI) remains challenging with substantial levels of physical, psychological socio-economic burden.

The aim of this study is to examine the challenges experienced by patients with BTI from hospital admission to 6-months after hospital discharge.

**Methods:** Participants were recruited from trauma patients admitted with BTI and were recruited from 7 sites across England and Wales between March and June 2019. Semi-structured interviews were conducted at six-months after discharge from hospital, and in total 11 interviews were undertaken. Interviews were recorded, transcribed, and analysed with reflexive thematic analysis.

**Results:** Two themes were identified within the data: (i) Challenges within the acute hospital admission where pain and analgesic management and the processes of investigation and treatment were the sources of most challenges to recovery. (ii) Challenges within the post-discharge recovery journey, where managing pain at home, unidentified injuries, and mental well-being impacted most on recovery.

**Conclusions:** This study adds to the body of qualitative evidence surrounding recovery from major trauma and the patient experience within the recovery journey after BTI and It is important that clinicians consider the whole recovery journey as a continuous process rather than two isolated processes.

## 1. Introduction

Major trauma is associated with continued year on year increasing burden with sustained levels of mortality and morbidity, and from a global perspective, 'road related injuries' and 'falls' have sat within the top 25 causes of increased 'disability adjusted life years' for all age groups over the last 30 years [1]. Blunt thoracic injury (BTI) is a common presentation to trauma hospitals and emergency departments globally with circa 15% of all trauma admissions presenting with a component of BTI. In the United Kingdom (UK), between April 2016 and May 2017, 16,638 patients with BTI were seen in National Health Service hospitals representing an under-recognised but substantial burden on the health services [2].

There is a paucity of qualitative research in the broad area of injury

care which has resulted in a gap in the evidence base particularly in relation to exploring the meaningful experiences of patients recovering after physical injury. Specifically relating to BTI management, one qualitative study of injury rehabilitation identified pain and shortness of breath as key factors affecting daily life [3]. Despite many participants feeling 'relieved to be alive', the subsequent limitations in physical functioning left the participant's 'life on hold' and unsure when symptoms would improve [3]. This study was undertaken with participants who had access to outpatient rehabilitation care but for most patients, there is little post discharge follow-up, leaving most patients to navigate their recovery unsupported [4,5]. Overall, it is important to see the journey to recovery as a continuum that spans both the hospital admission and post discharge period [6] as it is likely that the challenges experienced in hospital will have a lasting impact on the post discharge

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recovery [7].

The aim of this study is to examine the challenges experienced by patients with BTI from hospital admission to 6-months after hospital discharge and identify key difficulties that have influenced the experience of recovery. Having greater understanding of the patient journey is an important component of care provision and without this knowledge, it is not possible to provide the level of care needed by these patients. Furthermore, we need this knowledge to mitigate the risk of wasting resources by designing evidence informed policies, guidelines, and pathways in this area of trauma care.

## 2. Methods

### 2.1. Design

A qualitative study using semi-structured telephone interviews was conducted. This manuscript has been developed following the Standards for Reporting Qualitative Research (SRQR) [8].

### 2.2. Study setting

The study included seven geographically diverse sites across England and Wales out of a total of 12 potential recruiting sites covering urban, suburban, and rural areas. All sites were UK National Health Service Hospitals that were designated receiving hospital for trauma patients (See Table 1).

### 2.3. Study sample and recruitment

Between March and June 2019, semi-structured interviews were conducted with 11 participants who had been admitted to hospital with BTI. Decisions relating to sample size were made pragmatically based on guidance from Braun and Clark who discourage the use of data saturation within their thematic analysis method [9–11]. BTI injury severity has been described using no. rib fractures, co-morbidities, participant age and the presence of extra-thoracic injuries. Severity of extra-thoracic injuries have been categorised based on the Abbreviated Injury Scale (AIS) which is a globally recognised, anatomically based injury severity scoring system [12]. Interviews were undertaken at six-months after discharge from hospital. All participants were recruited into the 'Rib Injury Outcomes Study', that aimed to investigate changes in Health-Related Quality of Life and pain outcomes in patients with BTI over a six-month period after discharge from hospital using a mixed-methods approach. The quantitative component of the study involved longitudinal survey methods whereby participants completed questionnaires at four data collection timepoints over the first 6-months after discharge from hospital.

Patients were recruited by clinical research staff at each site during the initial inpatient admission to hospital where informed consent was taken. Patients were purposely selected for interview from those patients who agreed to be interviewed during initial recruitment to the Rib Injury Outcomes Study which is an observational study of BTI outcomes after usual care based on characteristics including age and indicators of injury severity. A sampling framework was developed focusing on factors including participant age, gender, geographical location, and indicators

of injury severity (i.e., number of rib fractures, number of co-morbidities and discharge functional status) and a maximum variation sampling approach was applied. Patients who agreed to being involved were contacted by EB approximately one-month prior to reaching their 6-month post discharge data collection timepoint to discuss participation. Interviews were undertaken after the 6-month quantitative data collection timepoint had been completed and was therefore the final component of data collection in the study. Participants were offered choices in relation to how interviews would be conducted (at home, hospital site or via telephone).

### 2.4. Data collection

All interviews were undertaken by one interviewer (EB) who is an experienced Registered Nurse in emergency care currently undertaking a clinical doctoral research fellowship but was not directly involved with the provision of care for any participants. Participants were encouraged to lead the discussion and encouraged to consider topics openly. Prior to finishing the interview, EB summarised the main discussion points from the interview to confirm that the participants statements were correctly understood within their context and allow participants to explore areas of personal interest in further details. Participants were given opportunities to ask questions both before and after the recording started and finished to ensure they were comfortable throughout the data collection process. Interviews were audio recorded with permission and transcribed verbatim by a professional transcription service. All transcribed interviews were reviewed with audio to check for accuracy and consistency.

### 2.5. Topic guide

The semi-structured interview guide was developed using the literature on qualitative interviewing techniques and previous qualitative work on recovery after traumatic injuries [3,13]. Table 2 presents the interview topic guide.

Questioning was open-ended and where appropriate participants were given flexibility to lead and direct the discussion.

### 2.6. Data analysis

Data analysis was undertaken using Braun and Clarke's process of reflexive thematic coding [9,10]. Interview transcripts were uploaded to NVivo v.11 (QSR International Ltd) and initial data analysis was undertaken by EB as this study forms a component of an educational programme. This was followed by an in-depth discussion of the data with GL formulating codes, sub-themes, and overarching themes. Further discussion around definitions of themes and codes between EB, GL, AX, and CN and subsequently code and theme names and definitions were secured. Thematic analysis focused on recognising and exploring patterns within the data but also allowed for the development of themes from the data [14,15]. Themes were identified by drawing together components or fragments of participants' ideas or experiences. When combined together, these concepts formed a comprehensive picture of the collective experiences of the participants [10]. The thematic coding process followed a six-stage approach: (i) Emersion in the data; (ii)

**Table 1**  
Recruiting site characteristics.

	Geographical Location:	Geographical population type:	Population size:	Trauma network status:	Number of beds:
Site 1	South Wales	Sub-urban/rural	c. 390,000	Trauma Unit	750
Site 2	Greater London	Urban	c. 1.5 million	Major Trauma Centre	484
Site 3	Northern England	Sub-urban/rural	c. 600,000	Trauma Unit	1159
Site 4	South England	Sub-urban/rural	c. 535,000	Trauma Unit	697
Site 5	Greater London	Urban	c. 1 million	Major Trauma Centre	950
Site 6	South-west England	Urban	c. 900,000	Major Trauma Centre	996
Site 7	Home Counties	Sub-urban/rural	c. 525,000	Trauma Unit	369

**Table 2**  
Interview Topic Guide.

Topic no.	Topic	Example questions/prompts
	Introductions:	Are you happy to continue with the interview today? Do you have any questions?
1	The injury	Can you tell me about your injury and how it happened?
2	The hospital admission	Can you tell me about your experiences in hospital? What challenges did you overcome while you were in hospital? Areas for focused discussion <ul style="list-style-type: none"> <li>• Pain</li> <li>• Pain Relief</li> <li>• Shortness of breath</li> <li>• Sleep</li> <li>• Mobility</li> <li>• Self-care</li> <li>• Mental health</li> <li>• The interprofessional team</li> <li>• Preparing for discharge</li> <li>• Friends and family</li> </ul>
3	Discharge Planning	Can you tell me about your discharge from hospital? How did you prepare for leaving hospital? Can you tell me how the hospital helped prepare you for going home? How were you involved in the discharge process?
4	Managing symptoms at home	What symptoms did you experience at home in the first few days after discharge from hospital? How did you manage these symptoms? Do you think you were adequately prepared for self-managing these symptoms? Areas for focused discussion: <ul style="list-style-type: none"> <li>• Pain</li> <li>• Pain relief</li> <li>• Shortness of breath</li> <li>• Exercise tolerance</li> <li>• Mobility</li> <li>• Activities of daily living</li> <li>• Accessing further medical support</li> <li>• Mental health</li> <li>• Positioning and comfort</li> <li>• Sleep</li> </ul>
5	Interests and activities	Tell me about your daily activities and interests before you were injured? How have these activities and interests changed since discharge from hospital? Is there anything that you cannot do now that you could before you were injured? How do you manage with everyday activities, like climbing the stairs, the housework or doing the shopping? How did you injuries change your usual physical exercise routine?
6	Getting back to normal	What have you done to try and help your recovery after your injuries? Can you tell me about going back to work? How has your injury affected the job that you do? What challenges do you think you will face in the future because of your injuries? How has your injury changed your relationship with your friends and family?
	Conclusions	Do you have anything further you would like to add? Is there anything that you would like to ask me?

Coding; (iii) Generating initial themes; (iv) Reviewing themes; (v) Defining naming themes; and (vi) Writing up the findings [9]. Themes and subthemes are reported in the results section and are illustrated using verbatim quotes and a pseudonym for the participant alongside the participants' age.

## 2.7. Ethical considerations

Ethical approval was granted by the 'Hampshire A' South Central Research Ethics Committee in June 2018 (ref: 18/SC/0230). Participants in this qualitative study were consented prior to data collection after participants information was provided. Participants were given opportunities to ask questions both pre- and post-interview and time was taken to ensure that the participant was comfortable with the process and interview content prior to closing the interview. Where required, participants reporting ongoing physical or psychological problems were sign posted to their local primary care clinician for further assessment. Participants were offered a £10 shopping voucher as a gesture of thanks for the time taken to participate.

## 3. Results

Of the eleven participants with BTI recruited, eight were male and the predominant mechanism of injury was Road Traffic Accident (including injuries on bicycles). Five participants (45%) had extra-thoracic injuries and not just BTI, but in all cases the BTI was the primary injury of concern. In all cases where extra-thoracic injuries were present, these had been classified as minor or moderate (1 or 2) using the AIS [12]. Table 3 presents participants' demographic profile developed during the data collection process.

Two main themes were identified from the analysis: (i) Challenges within the acute hospital admission, (ii) Challenges within the post discharge recovery journey. Table 4 presents the themes, sub-themes and codes identified during data analysis.

### 3.1. Theme 1: Challenges within the acute hospital admission

#### 3.1.1. Sub-theme 1.1: pain and analgesics in hospital

For all participants interviewed, pain was a part of their daily life during the acute hospital admission. For several participants recalling the experience of pain in the emergency department during their initial assessment highlighted the importance of achieving analgesia as early as possible in the patient's journey:

[John – 56] *'It was very painful for the transfer from the trolley onto the scanning bed, initially they were rolling me onto my injured side to move me onto the bed and I had to tell them to stop. There was absolutely no way I could take the pain where they were rolling me onto the injured side to get the backboard underneath me to slide me across.'*

For many participants the pain was extreme and difficult to describe but for several participants using previous pain experiences was a useful descriptive point of reference:

[Bill – 60] *'[My] heart attack was very painful like I was in agony, but it was a different type of pain. It was relatively short-lived, like you were being crushed to death and you couldn't breathe... So that was my benchmark for pain. I would say this has reached that benchmark, but I would just say that this was just pure pain. It's very hard to describe.'*

The high impact of the pain experienced by this group on daily physical functioning whilst in hospital was consistently reported by all participants:

[Sally – 27] *'...because I had such a loss of being able to do things, it was unbelievable. Little things like I couldn't move in my bed because I was in so much pain to reach a glass of water, I couldn't take myself to the toilet, I couldn't wash myself. I was just in so much pain it was terrible. I ended up getting a chest infection as well.'*

For many participants the specialist pain service played an important role in overcoming the challenge of acute pain in the hospital setting:

Table 3

Characteristics of participants.

Participant pseudonym	UK Geographical Location:	Age:	Gender:	Mechanism of injury:	No. of rib fractures:	No. of co-morbidities:	Discharge SF-12 Physical Component Score:	Extra-thoracic Injury	Interview Duration (mins)
Henry	South England	76	M	Fall < 2 m	4	4	17.41	Yes	36
Laurence	Wales	40	M	RTC	5	0	24.27	Yes	33
Sally	South England	27	F	Pedestrian vs. Car	0	1	28.10	No	56
Bill	London	60	M	Fall < 2 m	10	2	23.83	Yes	62
Gavin	London	60	M	RTC	17	0	33.88	No	30
Cilla	North England	70	F	Fall < 2 m	5	1	34.55	No	54
Robert	Wales	40	M	Fall > 2 m	8	0	16.69	No	67
Oliver	London	44	M	RTC	9	0	19.00	Yes	34
Daniel	London	39	M	Fall < 2 m	12	3	36.04	No	19
Christine	Wales	67	F	RTC	1	1	33.74	No	38
John	Home counties	56	M	RTC	7	1	22.98	Yes	51

Table 4

Themes and codes table.

Themes	Sub-Themes	Codes
Challenges within the acute hospital admission	Pain and analgesics in hospital	The experience of pain Accessing controlled drugs Regional analgesia Respiratory complications Shortness of breath Sleep
	Investigations and treatment	Invasive procedures Physiotherapy input Diet and Nutrition Poor communication strategies Aspects of discharge planning
Challenges within the post discharge recovery journey	Pain and analgesics at home	Pain as a daily phenomenon Physical functioning Adaptations to daily life
	The Hidden Injury	Unidentified injuries Follow-up
	Impact of injuries on mental wellbeing	Impact on mental health Family and Friends Planning for the future Impact on Lifestyle Return to work

[Sally – 27] ‘Honestly the pain team were amazing. So, before they visited me, I was just in so much pain and that’s when the Tramadol came along. So, they recommended some stronger things so I could just get moving a bit more, and it really did help. After that point I was able to take myself to the toilet, carefully of course.’

One participant highlighted limitations with the service provided as they were only available in office hours:

[Oliver – 44] ‘The pain team was perhaps the worst experience because they didn’t work weekends and of course weekends was always when things went wrong. My medication was changed or ran out or things like that...’

Many participants discussed how their initial analgesic management plan of which often comprised of intermittently administered analgesics was not effective. For several participants, the timing for controlled drug administration on the ward was not conducive for achieving sustained analgesia:

[Cilla – 70] ‘...the Tramadol really has to be every six hours, of course that can’t work in a hospital setting and I’m not quite sure why, but it

can’t. I was getting a dose at 10 pm usually and then the next one wasn’t until 8am and so I was waking around 4am in extreme pain. Depending on who happened to be on nights depended whether I was actually even able to get any Morphine. So, it was a pretty miserable time.’

Several participants received thoracic epidural blocks to aid analgesia in the acute hospital setting. For these patients this was done as part of an escalating analgesic ladder where oral and injected analgesics had failed. One participant described how the thoracic epidural made a substantial impact, not only on pain but on respiratory function and physical functioning:

[Gavin – 60] ‘Just to inflate my lungs caused a lot of pain so I was shallow, fast breathing so that made a huge difference and I could take the lung full of air in after the epidural went in. So that was terrific... I was moving around on the ward; I had this pack thing with the epidural pump and they had an exercise bike there and I would have a go on that...so I think they assumed that I had made a recovery and so they switched it off and I was stuck in my chair. I couldn’t move and I was in a lot of pain. Well, they kept it going I think for another day and then put me on strong oral analgesics and that sort of seemed to do the [trick]- but wasn’t as effective as the epidural.’

One participant removed his epidural catheter accidentally whilst mobilising around the ward resulting with an early trial without regional analgesia and an early hospital discharge:

[Oliver – 44] ‘...the epidural came out just by accident. It got caught on something and pulled out. That accelerated my discharge because obviously they couldn’t send me home with the epidural in and a cannister of local anaesthetic.’

### 3.1.2. Sub-theme 1.2: investigations and treatment

Due to the severity of the BTI and underlying organ injury, several participants required a chest drain during their initial resuscitation in the Emergency Department:

[Sally – 27] ‘It’s like something out a sci-fi film. Obviously, they numbed the area completely and the staff were professional, and kind... I think you just feel vulnerable and you just need everyone’s help. I just remember accepting everything that was happening because I think it’s kind of crazy actually. I think I signed a consent form, but I was out of it really on the pain and the drugs, but you just accept it because you are at the mercy of other peoples’ expertise at that point.’

Another participant having the same procedure echoed the experience of being completely dependent but reported a wholly different experience. For this participant, the drain insertion was not successful, but the lack of communication had a significant impact on the confidence the patient had in the care he was receiving:

[Bill – 60] *'I only overheard conversations, I was in so much pain. But they seemed to have a problem with the [chest drain] equipment, and they were saying oh we've not got this, we need to go up to the theatre and get this and get that. I think they were in a bit of a flap. I had a couple of friends that were with me who were very concerned, and they didn't think I was getting good treatment. So, they tried to get something in, it was too painful. Eventually they decided that I should get transferred to the trauma centre.'*

After the experience of having a chest drain inserted, one participant described the challenges related to decision making for chest drain removal after having operative rib fixation:

[Robert – 40] *'At this point when you are attached to a drain as well you just feel much more hopeless... The surgeon came to see me after the operation and said look everything has gone well; we've put the drain in and hopefully we can take that out the following day because there's still a haemothorax... [Three] days afterwards the surgeon came back... they did another x-ray and said, yes let's take the drain out, which is a weird experience but also extremely nice when it's out.'*

For a small number of participants, the diagnostic imaging that they received during their initial evaluation after arriving in hospital highlighted incidental findings that might otherwise have been left undetected:

[Christine – 67] *'...the most amazing thing is that they found a growth on my ovary [and] eight weeks ago I had a full hysterectomy... It turns out to have been a low malignancy tumour. Because they'd operated and taken everything out it's now fine. So, if you want to say an accident was supposed to happen...'*

Several participants reported issues whereby insufficient or incorrect information relating to the injury or treatment was provided by the clinical team leaving some participants confused and unable to understand their injuries or treatment options:

[Sally, 27] *'It was so terrifying having an injury like that. I still don't understand it. I imagine it takes many, many years to really understand the respiratory system and I just couldn't get my head around the injury and I would have really liked more of an explanation about what the injury was.'*

For one participant, the poor communication impacted on their ability to make important decisions about their ongoing post discharge medical care, resulting in them resorting to medical advice from the internet for support:

[Laurence – 40] *'...when I first got admitted I was told I didn't have any broken ribs, then when they had the scan results back, I was told I had four broken ribs... When I spoke to the consultant, they said you need to decide if you want [to have operative rib fixation] or not and let me know... When I rang back to speak to the surgeon, they didn't have any record of it, and nobody knew anything about it. In the end I didn't have it done... I tried to do a lot of searching on Google and things like that, long term quality of life after displaced rib injuries without having the rib fixation and it's hard to really find any information.'*

### 3.2. Theme 2: challenges within the post discharge journey to recovery

#### 3.2.1. Sub-theme 2.1: pain and analgesia at home

Pain in the immediate post discharge period was reported by several participants as a substantial challenge to overcome, particularly after receiving complex analgesic modes whilst in hospital. For one participant, the journey home from hospital was disruptive to her progress and recovery:

[Sally – 27] *'... I remember getting into the car was difficult anyway just because you don't realise how much you bend your torso. Then when I got*

*home... I had a [incentive] spirometer, I was shocked how much I couldn't get the smiley face to go up.'*

Many participants were able to map the improvement in pain over the initial weeks and months after discharge from hospital and the regular improvement in these symptoms was beneficial to understanding their level of physical function:

[Bill – 60] *'[When I got home] I was down to about a 6 or 7 pain [score]. I could sit up in bed, it was quite difficult to do anything, but I was in constant pain for quite a long time. After about probably two to three weeks it was slowly decreasing to 4, maybe after a month it was down at 3... I was still unable to lie flat. I couldn't lie down in bed properly for a month and I still couldn't lie properly on my back, I had to be on my right side, so I couldn't possibly lie on my left side. It probably took about 8 weeks for me to actually lie on my left side.'*

For many participants, weaning from opioid analgesia was challenging and a process of trial and error, mostly without the support of a healthcare professional:

[Cilla – 70] *'But after about three weeks, I must have been feeling that I could manage without it and I tried to cut the Tramadol by half but that didn't work, so I went back on to the full dose again. But then I was beginning to get incredibly nauseous. I couldn't eat... And finally, I thought no I've just got to get off the opioids regardless of the pain. So, I just gritted my teeth and came off them completely for a week. It was a pretty miserable week.'*

For several patients the process for accessing further opioid analgesic agents was challenging and in one case resulted in the participant being left without medications:

[Oliver – 44] *'The pain relief proved to be fairly problematic because I was discharged with only a week worth of Oxycodone and they said I should see my GP to get more and I of course couldn't get an appointment with my GP for three weeks. So, I eventually managed to get some after having been without for a few days, which was very unpleasant for everyone around me.'*

For many participants, the side-effects of the opioids were challenging when trying to undertake normal daily tasks:

[Cilla – 70] *'The Morphine and the Tramadol were just awful. I kept thinking at least I can catch up on a load of reading and writing, but I couldn't because I couldn't concentrate.'*

One participant described how the analgesic medications had dual roles, managing both pain and optimising disturbed sleep patterns:

[Oliver – 44] *'The only way I could sleep for some while was to take the Oxycodone and Amitriptyline just before bed.'*

For participants returning to employment after BTI, it was sometimes difficult to identify when they were sufficiently recovered to return to work. This challenge was equally described by participants who worked in physically demanding and relatively sedentary work roles:

[Sally – 27] *'I went back to work about eight weeks afterwards, I think. Even then I was very wary of my movements because sudden movements might cause me pain and I didn't want to make anything worse.'*

At six-months after discharge from hospital, many participants described that pain had resolved, but for several participants, particular physical actions continued to result in pain:

[Oliver – 44] *'I guess relating to the rib injury in particular it still hurts when I cough and sneeze, not a huge amount, but that's pretty much the only time I now get a stabbing pain.'*



### 3.2.2. Sub-theme 2.2: the hidden injury

Several participants reported identifying symptoms that did not improve within the expected timeframe. In these situations, it was sometimes necessary for participants to become the driving force behind reaching a diagnosis or referral on to other services. This often took multiple visits to several different clinicians:

[Christine – 67] ‘...nobody had said until I saw the spinal specialist that there was probable damage to the brachial plexus. I just assumed I had a sore shoulder... but the pain in the arm was worse and that was in my lower arm.’

For one patient, this prolonged process of ‘pushing’ clinicians led to the diagnosis of a phrenic nerve injury with a paralysed hemidiaphragm which had initially been missed:

[Bill – 60] ‘I was able to start doing a bit more exercise in the gym and I found I was having problems with breathing...I said to the [orthopaedic] consultant, since I was discharged from trauma, I’ve got no real follow up on my ribs and I do feel like my breathing is problematic... So, he referred me to the chest clinic... they had a look at the x-rays and my diaphragm was sitting quite high on my left side. That had been noticed at the time of the accident on the scans but when they had a look again it was slightly even higher. I did some [lung] function tests where my breathing was impaired and got poor results. So, then I had a dynamic test for the diaphragm with an ultrasound, which showed that it wasn’t really moving.’

### 3.2.3. Sub-theme 2.3: impact of injuries on mental wellbeing

For many participants, their experience of recovery after BTI did not impact on their mental wellbeing. Several participants reported this was because they could see a gradual improvement in symptoms over time and they could see a time when they would be fully recovered. Conversely, several participants described a psychological burden which was associated with their injury mechanism and recovery journey. For one participant this sequela developed over several weeks after discharge from hospital after reflecting on her recollections from the accident itself:

[Sally – 27] ‘At the time I hadn’t processed, I was still feeling lucky to have not been killed or brain damaged. But it’s more in the weeks afterwards thinking back to it and even now thinking back to it it’s kind of horrifying. I felt vulnerable and fragile...and frail... I feel more scared of things. I think I’m more frightened of things I wasn’t before’.

For other participants, the mental health sequelae were related to the speed of their recovery and the isolation related to their ongoing disability:

[Cilla – 70] ‘I got very low at the beginning of February I think for about three weeks. It was possibly pain related, but it was more just frustration and irritation in a way and anger that it had happened at all because I had actually just come through a number of very difficult years.’

[Bill – 60] ‘I would say the last two months have been a bit more depressing... I knew it was going to take a while and I was quite patient but I’m not so worried about my bones hurting or my limbs which you can work on and they’ll get better over time, but my lungs are very concerning... I’m a little bit down about that.’

## 4. Discussion

For most participants, the experience of pain and challenges associated with analgesic management was an obstacle through both the acute hospital admission and during the post discharge recovery period [16]. Amongst many participants, there was a misconception that achieving analgesia by not moving was beneficial for their recovery. The risk of complications increases with immobility, and the therapeutic aims of

analgesic management focuses on achieving analgesia at both rest and when mobile to manage the risk of respiratory complications [17]. For patients who received regional analgesics, the substantial impact of this on the pain experience was clearly defined. In clinical practice, there are several clinical factors that influence whether regional analgesia is achieved in this patient group [18]. Aside from these clinical influences, there is a clear variability of skilled clinicians who can undertake certain regional techniques such as thoracic epidural insertion and a limited evidence base to the effectiveness of modes such as Serratus Plane Blocks and Erector Spinae Blocks [19]. Despite this, there is a growing understanding that a multi-modal hierarchical approach to pain management is needed in the acute hospital setting [20].

The experience of having invasive procedures such as an intercostal drain inserted during the initial resuscitation and stabilisation period was vividly described. For participants there was fear associated with this surgical procedure that was exacerbated by the pain they were experiencing and the fact that they felt disassociated from the process. Overall, these experiences describe how dependent patients feel on members of the trauma team. It is clear that when things were not going to plan, the behaviours and communication skills of the team had a significant impact on the confidence that patients have in the competence of the individual undertaking the procedure and the overall ability of the team responsible for the care provided [21]. It is unclear if these experiences influenced their subsequent experiences and challenges throughout their recovery.

Overall, communication processes and the therapeutic relationship between trauma clinicians has been highlighted within many of the experiences reported in this study. For clinicians, this can be very challenging, particularly in the initial resuscitative phase of BTI management [22]. It is vital that all trauma healthcare professionals are aware of the need for effective communication and have active strategies for building therapeutic relationships with patients who are scared, in very unfamiliar environments and experiencing extreme symptoms such as pain and difficulty in breathing [21]. Similarly, communication and provision of injury-related information to participants was raised by several participants. One participant described how decision-making responsibility for having surgical fixation of displaced rib fractures left the patient with little information and support. For this participant, these experiences negatively influenced their perception of the quality of care they received. It is important that at organisational level, trauma hospitals have the infrastructure and governance in place to ensure patients are provided with accurate, easy to comprehend information about their injuries and adequate support to be involved in their care as informed decision makers [23].

For several patients, the trauma focused investigations identified incidental findings that impacted on patients’ experience of recovering from their injuries. In some cases, these findings are potentially serious medical conditions that might otherwise not have been identified [24]. It is interesting within these data to see how the findings influence the participants’ perspective about their traumatic injuries. Although the phenomenon of incidental findings in diagnostic testing is reported in different populations, this is often underrepresented in the trauma evidence [25]. There is a need for greater understanding about how incidental diagnostic test findings influence patient’s recovery from traumatic injuries, particularly where further investigation, treatment, and surgical intervention is required [26].

The presence of unidentified injuries in this population is concerning and under-represented within the trauma literature [27]. It is important that trauma hospitals have strategies in place to ensure accurate and adequate identification of injuries to mitigate this risk. The tertiary survey is a complete patient reassessment commonly undertaken late in the acute admission for trauma patients and may be an important factor in the identification of hidden injuries not identified in the initial investigation and management period [28]. In the case of one participant, the abnormal position of the hemidiaphragm was identified during the initial investigation of injuries but not investigated further despite

this being an evidenced injury sequela [29]. As there is a paucity of research investigating this phenomenon, it is important that the incidence of missed injuries in BTI is investigated in future longitudinal follow-up research studies, particularly where follow-up is provided [30].

#### 4.1. Strengths and limitations

This qualitative interview study included 11 participants. Although this is a small study these participants were recruited from diverse geographical locations within England and Wales, with a broad range of injury severities and included all levels of trauma receiving hospitals. The diversity in the geographical location of participants and variation in indicators of injury severity are strength in this study allowing a greater understanding of the complexities of the recovery journey after BTI. This study has highlighted several important challenges that patients have to overcome during their recovery after BTI and remains one of only a small number of qualitative studies undertaken exploring the experiences of recovery in this population. This study was undertaken as part of an education programme and therefore data collection was undertaken by only one researcher. It is important to note that although this introduces consistency in the process it can also affect the validity of the findings. All other supervisory team members were integrated into the process of naming and defining themes, sub-themes, and codes to ensure rigor in the analysis. Furthermore, as participants were interviewed after six months, this could impact of their recollection of events. Within the analysis of these data, the assumption has been made that the participant recall are true events as they occurred.

Rigour is an important concept in qualitative data analysis. Within this study, rigour was consist as a trustworthiness criteria was implemented to ensure that precise, consistent and exhaustive methods were employed throughout [31]. Field notes and reflexive notes were maintained throughout the data collection and analysis processes to provide a clear record of pertinent thoughts, decisions and choices made in the study.

#### 5. Conclusion

The recovery period after traumatic injury is a challenging time for patients, particularly those with BTI. The vivid descriptions of these challenges add substantially to the knowledge of the treatment and recovery journey. This study has highlighted complexity within the patient journey from the participants own perspective. This is an important component in understanding the recovery journey, patient experience and ultimately the first step in improving the quality of care provided to patients with these injury types. Clinicians need to consider the whole recovery journey as a continuous process rather than separate processes of recovery in hospital and recovery after hospital discharge.

#### Author contributions

EB, AX, CN, PH & GL conceived and designed this study and collaborated to develop the protocol. GL, AX, CN & PH are EB's academic supervisors at King's College London. Data Collection and initial analysis was undertaken by EB. Consensus on analysis was agreed with EB, AX, CN and GL. EB undertook the initial draft of the manuscript, and AX, CN, PH & GL contributed substantially to subsequent drafts and revisions. All authors approved the final version of the manuscript. EB takes responsibility for the paper.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ienj.2021.101045>.

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